

**TEAM SEX COMPOSITION EFFECTS ON TEAM PERFORMANCE ON  
COMPLEX PSYCHOMOTOR TASKS: PSYCHOMOTOR ABILITY OR  
TEAM PROCESSES?**

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## **ABSTRACT**

**Team Sex Composition Effects on Team Performance on Complex Psychomotor Tasks:  
Psychomotor Ability or Team Processes? (April 2013)**

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Complex psychomotor tasks are commonly used to investigate team phenomena. While, sex-based differences on these tasks have been well documented, their effect on team research findings is often overlooked and has only recently been demonstrated. It is not known whether sex composition effects can be best attributed to psychomotor ability or team processes on complex psychomotor tasks. Consequently, this study investigated the comparative contributions of psychomotor ability and team process variables to the observed performance differences between teams with different sex compositions on complex psychomotor tasks. One hundred and thirty-eight individuals, participating in 46 3-person teams, performed a computer-based complex psychomotor task. Psychomotor ability and team processes (i.e., team voice and cohesion) were measured. Teams with a higher proportion of males outperformed teams with a higher proportion of females. Hierarchical regression mediation analysis revealed team sex composition effects on team performance were mediated primarily by team psychomotor ability and the contribution of team processes was not significant. The results of the study suggest that sex-based differences on team performance on complex psychomotor tasks are primarily due to team psychomotor ability and that the effects of team processes are negligible. The implications

of these results for the design of studies investigating team training and performance phenomena using complex psychomotor tasks are discussed.

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# **CHAPTER I**

## **INTRODUCTION**

As the complexity of the workplace continues to grow, organizations are increasingly relying on work teams to perform complex tasks (Salas, Cooke, & Rosen, 2008). Thus, researchers and practitioners are interested in identifying factors that influence team performance, such as team processes (Kozlowski & Bell, 2003), team training and design (Arthur, Bell, & Edwards, 2007; Villado & Arthur, 2013), individual differences (Griffith, Voloschin, Gibb, & Bailey, 1983), and team composition (Bell, 2007). The effects of these factors on team performance in static environments are well documented. However, as a better understanding of the complex and dynamic nature of teams is developed, researchers are realizing the importance of investigating teams in dynamic environments (Salas et al., 2008).

A common practice in lab-based team research is the use of synthetic team task performance environments to simulate or model real world tasks. Synthetic team task performance environments are complex psychomotor tasks and are used extensively in lab-based research to study team-based variables in the context of team training and performance. They are a valuable contribution to team training research because they incorporate realistic representations of real world tasks (Schiflett, Elliott, Salas, & Covert, 2004), which is important for establishing external validity and experimental control and, in turn, are necessary for establishing internally valid results (Cooke & Shope, 2005; Martin, Lyon, & Schreiber, 1998). Types of synthetic environments include computer-based simulators such as the task used in the present study. Additional examples in the extant literature include simulations and games such as Space

Fortress (Mane & Donchin, 1989), Steelbeasts Pro PE (Villado & Arthur, 2013), Air Combat Effectiveness Simulation (Entin & Sefarty, 1999), and Unreal Tournament 2004 (Hughes et al., 2013).

Although synthetic team performance tasks are widely used to study team-related phenomena, the skills and abilities required to successfully perform them have noted sex-based differences which may confound research findings when these sex differences are not a variable of interest (Hyde, 2005). Despite the well documented sex differences on synthetic team task performance environments, previous research has paid limited or no attention to this issue. An exception is Jarrett, Glaze, and Arthur (2012) who not only showed the effect of sex composition on team performance, but also demonstrated that, if not controlled for, sex composition can adversely affect the validity of the research findings. However, Jarrett et al. did not separate the differential effects between team processes and psychomotor ability. Thus, it remains plausible that the observed differential effects may be due to concomitant differences in process variables. Consequently, the objective of the present study is to assess the comparative contribution of psychomotor ability and team process variables to the observed performance differences between high-female and low-female proportion teams.

### **Sex differences in psychomotor ability**

Sex differences have historically been of interest to researchers. Early researchers and practitioners have attributed sex differences to biological differences, whereas more contemporary researchers argue that sex differences are a function of both genetic and social factors (Levine, Vasilyeva, Lourenco, Newcombe, & Huttenlocher, 2005). In the context of the

present study, a vast amount of previous research has demonstrated sex differences on variables such as team processes and psychomotor ability (Ackerman, 1988; Barrick, Stewart, Neubert, & Mount, 1998; Brown, Hall, Holtzer, Brown, & Brown, 1997; Thomas & French, 1985), that are relevant to the composition of teams.

Psychomotor ability is an individual difference which includes abilities such as reaction time, control precision, rate control, arm-hand steadiness, manual dexterity, finger dexterity, wrist-finger speed, and speed of limb movement (Fleishman & Reilly, 1992). Previous research indicates that males demonstrate superior performance on psychomotor tasks and abilities important to the performance of synthetic team performance tasks. For example, compared to females, males consistently exhibited superior performance in reaction time and finger tapping across various age groups (Brown et al., 1997; Ruff & Parker, 1993). Males have also been shown to outperform females on measures of hand dexterity (Ruffer, Grapenthin, Huey, & Patterson, 1985).

Action-based video games are prototypical examples of synthetic team performance tasks and it was previously posited that the observed male/female differences on these games were due to males' higher video game experience. However, females have been shown to have lower performance than males on complex psychomotor tasks, such as those found on video games, even when experience with these tasks is controlled (Brown et al., 1997); thus demonstrating that video game experience does not fully explain male/female performance differences on psychomotor tasks. So, because sex differences in psychomotor ability have been frequently



found to be related to performance differences on complex tasks such as those represented by the synthetic team performance task used in the present study, it was hypothesized that:

*Hypothesis 1:* Team psychomotor ability will be positively related to team performance such that teams with higher psychomotor ability will outperform teams with lower psychomotor ability.

### **Team sex composition**

Team sex composition refers to the sex make-up of the team and is suggested to influence performance outcomes because of the significant amount of research that has demonstrated sex differences in a variety of individual and team-level variables (Kozlowski & Bell, 2003). Due to the sex differences in psychomotor ability and team process, team sex composition is thought to be related to team performance on complex psychomotor tasks because it affects the collective ability that the team brings to the task. The effects of team sex composition on these variables are suggested to be an important determinant of team performance outcomes (Bell, 2007) and may significantly impact the outcome on synthetic team performance tasks used in team training research. Although team composition is a commonly studied team variable, little research has been undertaken to understand the role of sex in team composition and its subsequent effect on team performance on complex psychomotor tasks. And so, consonant with the extant literature, it was posited that:

*Hypothesis 2:* Team sex composition will be related to team performance such that teams with a lower proportion of females will outperform teams with a higher proportion of females.

Furthermore, because team sex composition has been found to be related to team performance as well as influence team psychomotor ability, and because team psychomotor ability has been shown to influence team performance, it was hypothesized that:

*Hypothesis 3:* Team psychomotor ability will mediate sex composition's effect on team performance.

### **Team processes**

Team process refers to the interactions that take place among team members such as team voice and cohesion (Barrick et al., 1998). Males and females tend to exhibit different interaction styles such as active task behavior (i.e., giving opinions and information) and positive social behavior (i.e., communication and agreeing) which influence team processes and may either impair or facilitate team performance depending on the task (Bales, 1970). Synthetic team performance tasks have been characterized to require high levels of psychomotor ability which, in turn, requires more active task behavior than positive social behavior. Males have demonstrated greater active task behavior than females, which is likely to facilitate team performance on complex psychomotor tasks. However, females have exhibited more positive social activity (Carli, 1982; Steiner, 1972), which may have little effect on team performance on complex psychomotor tasks.

Although previous research has demonstrated that team voice and cohesion tend to be positively related to team performance on non-psychomotor tasks (Barrick et al., 1998; Wood, 1987), little or no research has investigated the role that team processes play in the performance of complex psychomotor tasks. Thus, it is important to investigate the role that team processes play in the

performance of complex tasks with high psychomotor demands. A framework commonly used to investigate team interaction process is the input-process-output framework. This model postulates that input factors such as team sex composition affect team interaction processes (i.e., team voice and cohesion) which, in turn, affect team output (Guzzo & Shea, 1992; Hackman, 1987). Team processes are important because they represent a means by which team inputs are transformed into team outputs such as performance.

Team cohesion, which refers to the forces that bind members to each other and to their team, fosters task commitment and group pride (Guzzo & Shea, 1992). It indicates positive interpersonal dynamics within a team and has been positively related to team performance (Beal, Cohen, Burke, & McLendon, 2003). In general, cohesive teams tend to consist of members with increased communication, task commitment, and positive social activities (Beal et al., 2003; Mickelson & Campbell, 1975). According to Mullen and Cooper (1994), task commitment is the strongest component of cohesion that contributes to the cohesion-performance relationship. Thus, because males tend to engage in more task behavior than females, it is likely that teams consisting of a high proportion of males will exhibit more cohesive behavior which, in turn, may result in performance differences on psychomotor tasks between high-female and low-female proportion teams. (Anderson & Blanchard, 1982).

Team voice is the extent to which team members feel they can freely communicate ideas, suggestions, or opinions intended to improve team performance (LePine & Van Dyne, 1998; Tangirala & Ramanujam, 2008). Previous studies have demonstrated that team voice may improve team performance on non-psychomotor tasks because teams are interdependent, and

thus depend on team members to share knowledge, unique ideas, and insights in order to perform the task successfully (LePine & Van Dyne, 1998; Mesmer-Magnus & DeChurch, 2009).

However, because psychomotor ability cannot be readily learned, the free communication of unique ideas and information within the team will not improve a team member's ability to perform the task. Thus, because synthetic team performance tasks rely heavily on psychomotor ability, it is suggested that team voice will have little or no direct effect on team performance. However, team voice has been shown to promote team cohesion (Beal et al., 2003) which, in turn, may directly improve team performance. Hence, it was hypothesized that:

*Hypothesis 4:* Team processes will be positively related to team performance such that (a) teams with higher levels of cohesion will have higher levels of performance, and (b) teams with higher levels of team voice will have higher levels of performance.

Furthermore, because team sex composition has been found to be related to team performance as well as influence team processes, and because team processes has been shown to influence team performance, it was hypothesized that:

*Hypothesis 5:* Team processes will mediate sex composition's effect on team performance.

### **Comparative role of psychomotor ability and team processes**

Due to the limited research on the effects of team sex composition on team performance on complex psychomotor tasks, it is unknown whether the expected differences in team performance are best explained by the expected differences in team psychomotor ability or team processes. Whereas research indicates that both explanations are plausible, little research has directly investigated both influences simultaneously. Although team process and psychomotor

ability have demonstrated sex differences, team processes have been unexplored when studying the influence of psychomotor ability on team performance. Thus, the present study sought to investigate the comparative role of psychomotor ability and team process as an explanatory mechanism for the sex composition-team performance relationship. Specifically, the present study sought to answer the following research question: Which, team processes or psychomotor ability provides a stronger explanatory mechanism for the sex composition-team performance relationship?

## CHAPTER II

### METHOD

#### Participants

Participants were recruited from the human subject pool of the psychology department at a large U.S. southwestern university and participated to fulfill a course requirement. Participants were also eligible to earn a monetary reward of \$80, \$40, or \$20 (per person) for teams that attained the three highest average performance scores, respectively. The sample consisted of 138 (56.52% female) individuals who participated in 46 3-person teams. The 46 teams represent four different levels of team sex composition from all-female to all-male teams. The frequency distribution of the team sex composition breakdown is presented in Table 1. The participants' mean age was 19 years ( $SD = 0.56$ ). Participants reported having average video game experience (mean = 1.73,  $SD = 0.69$ ; video game experience was measured using a 3-point scale where 1 = novice, 2 = average, and 3 = expert).

Table 1  
*Team Sex Composition Frequency Distribution*

Team Sex Composition	Frequency	Frequency %
0-Male	12	26.09
1-Male	13	28.26
2-Male	16	34.78
3-Male	5	10.87
Total	46	100.00

*Note.*  $N = 46$  teams. 3-Male=all-male teams; 2-Male = 2 males/1 female; 1-Male = 1 male/2 females; 0-Male = all-female teams.

## Measures

### *Psychomotor ability*

A psychomotor task was designed and developed for the study. This task was programmed using the INQUISIT Millisecond 3.0.6.0 (2012) software package to measure the speed with which participants could operate a mouse to point at and click on a target. Specifically, speed was measured by the amount of time it took participants to click on a series of moving dots that were presented on a computer screen. The task is similar to the Space Fortress aiming task (Mane & Donchin, 1989) and was designed to mirror elementary performance requirements (i.e., pointing and clicking a mouse) of the performance task. Team psychomotor ability scores were operationalized as the mean of all three team members' scores across 20 trials. In presenting the results, the direction was reversed such that higher scores reflect higher levels of psychomotor ability. The coefficient alpha for psychomotor ability scores was .76 at the individual-level, and .79 at the team-level.

### *Team voice and cohesion*

Team voice and cohesion were assessed using an 8-item measure that consisted of four team voice and four cohesion items. The team voice items were selected from Barry and Stewart's (1997) Group Process measure. The cohesion items were selected from Rosenfeld and Gilbert's (1989) Classroom Cohesion Questionnaire. The items for both measures were modified to fit the performance task and protocol. Participants responded to the items using a 5-point rating scale (1 = strongly disagree, 5 = strongly agree). Both team voice and cohesion scores were calculated

using the mean of all three team members' item responses. The coefficient alpha for the team voice ratings (team-level) was .74, and .75 for the cohesion ratings (team-level).

#### *Performance task-Crisis in the Kodiak: Oilrig Search and Rescue*

*Crisis in the Kodiak: Oilrig Search and Rescue* is a complex psychomotor task simulating a disaster response environment. This dynamic networked computer-based simulation allows individuals to work together as a 3-person team to complete a series of missions in a simulated off-shore oilrig explosion. Participants completed the missions as a team using three networked computers. Participants operated the simulator through a command-and-control interface using two monitors, a keyboard, and a mouse. The simulated environment consisted of a disaster response unit made up of three roles. Each participant operated one of three networked computers to perform one of the roles in the disaster response unit—oil rig workers, coast guard helicopters, or coast guard boats. Team members communicated with each other via voice activated microphones and headphones. The performance task was highly interdependent and included both task and outcome interdependency. Task interdependency existed at the level of the specific roles such that each task required the combined effort of two different roles in order to be completed successfully. Outcome interdependency existed at the team level. Specifically, missions were designed such that a single role was not able to complete the mission objectives without the assistance of the other two roles.

#### *Crisis in the Kodiak missions*

Teams completed a series of six missions which were performed over the course of two days. Teams completed one baseline mission and one practice mission which were identical to the



other four subsequent team missions. In addition, teams were informed that the scores for the baseline and practice mission would not count toward their overall team performance score. Each team operated 9 platforms (three for each role) to achieve the two objectives of shutting off four oilrig valves and healing and rescuing twenty injured survivors. Prior to each team mission, teams were briefed on mission objectives and were allowed a maximum of 2 minutes to formulate a strategy to complete the mission. After the briefing and planning session, teams were allowed ten minutes to complete each mission. The mission ended when (a) the team completed all mission objectives or (b) the ten minute time limit expired.

Points were earned for survivors healed (10 points per survivor stabilized), survivors rescued (10 points per survivor picked up), and oil valves shut off (50 points per valve shut off). Each mission had 20 survivors and 4 oil valves; thus, the maximum score for team performance was 600 points. The method used to determine performance scores was explained to participants during training and scores were available to be viewed during mission performance.

## **Procedure**

Table 2 presents an overview of the study protocol. The study consisted of two sessions and lasted five hours over the course of two days. Each session lasted 2.5 hours and was spaced 48 hours apart. During the first session, participants were randomly assigned to a specific role within the team (oilrig workers, coast guard helicopters, or coast guard boats), were familiarized with the study protocol, and completed informed consent forms. Team sex composition was not manipulated. That is, the specific configurations of team sex composition were naturally occurring in that participants were randomly assigned to teams and roles independent of their sex

as they enrolled for the study. The team received spoken training given by the study proctor that explained each role's capabilities as well as the study protocol. The team proceeded to participate in a team mission which served as a baseline for team performance.

Participants completed pre-recorded in-role and interpositional video tutorials individually at their workstation. The tutorials were self-paced and provided an in-depth demonstration of how to operate each role. The dual monitors allowed participants to follow along with the pre-recorded tutorials and the mouse was used to navigate through the tutorials and missions. Each computer had a voice-activated microphone and headset that allowed participants to listen individually to the tutorials as well as communicate with other team members throughout each mission. In addition, a task aide consisting of each role's capabilities was available onscreen during training and performance.

Table 2  
*Overview of 2-Day Study Protocol and Procedures*

<b>Study Protocol</b>	
<b>Day 1</b>	<b>Day 2</b>
Informed consent	Team Mission 3
Team member role assignment	Team Mission 4
Demographics	Team voice and cohesion measure
Spoken training	Psychomotor ability measure
Baseline mission	
In-role training	
Interpositional training	
Team practice mission	
Team Mission 1	
Team Mission 2	

*Note.* Team missions lasted 10 minutes. The total duration of the protocol was 5 hours.

On completing the tutorials, team members completed a series of team missions over the course of two days. Prior to all team missions, team members were encouraged to formulate a mission

strategy by participating in a two-minute strategy planning session with their teammates. Teams were allowed ten minutes to complete each mission. The team process and the psychomotor ability measures were administered after all the missions were completed. The data reported here and used for this study were collected as part of a larger experimental protocol and study.

## CHAPTER III

### RESULTS

Table 3 presents the descriptive statistics and intercorrelations among the study variables. A series of regression analyses were performed to test Hypotheses 1-5 (Table 4 and Table 5).

Hypothesis 1 predicted that teams with higher psychomotor ability would have better performance scores. Team psychomotor ability was strongly correlated with team performance,  $r = .57, p < .05$ .

Hypothesis 2, which predicted that teams with a lower proportion of females will outperform teams with a higher proportion of females, was also supported. Sex composition was strongly positively correlated with team performance,  $r = .60, p < .05$ .

Table 3  
*Descriptive Statistics and Intercorrelations for Study Variables*

Variable	Mean	SD	1	2	3	4
1. Sex composition	0.44	0.33	-			
2. Team voice	3.84	0.53	.26*	-		
3. Cohesion	3.83	0.51	.27*	.72*	-	
4. Psychomotor ability	1115	84.51	.23	.06	.00	-
5. Team performance	703.26	359.33	.60*	.11	.14	.57*

*Note.*  $N = 46$  teams. \* $p < .05$  (one-tailed). Team sex composition indicates the number of males on a 3-person team, such that 3 = all male team and 0 = all-female teams. Team voice and cohesion were both rated on a 5-point scale. Total team performance = mean of team missions 1-4.

Further, it was hypothesized that team psychomotor ability will mediate the relationship between team sex composition and team performance. A hierarchical regression analysis (see Table 4) revealed that team psychomotor ability was a significant mediator between team sex composition

and team performance,  $\beta = .46$ ,  $t(44) = 4.31$ ,  $p < .05$  and accounted for 20% ( $\Delta R^2 = .20$ ) of the variance in total team performance scores over sex composition. Finally, team processes did not account for any variance over sex composition and team psychomotor ability ( $\Delta R^2 = .01$ ,  $p > .05$ ).

Table 4  
*Hierarchical Regression Analysis for Team Psychomotor Ability*

Step	Variable	$\beta$	$R^2$	$\Delta R^2$
1	Team psychomotor ability	.57*	.33*	
2	Team sex composition	.60*	.35*	
3	Team sex composition	.49*		
	Team psychomotor ability	.46*	.55*	.20*
4	Team Sex composition	.49*		
	Team psychomotor ability	.46*		
	Cohesion	.08		
	Team voice	-.10	.56*	.01

*Note.*  $N = 46$  teams. \* $p < .05$ . Team performance was operationalized as the mean of all the team missions. Step 4 is the complete hierarchical model with team sex composition entered into the model first.

Hypothesis 4, which had predicted that teams with higher levels of cohesion and team voice will have higher levels of performance, was not supported. Both cohesion ( $r = .14$ ) and team voice ( $r = .11$ ) displayed positive, but small and non-significant relationships with team performance.

Hypothesis 5 predicted that team processes will mediate sex composition's effect on team performance. However, a hierarchical regression analysis (see Table 5) revealed that cohesion,  $\beta = .01$ ,  $t(44) = 0.08$ ,  $p > .05$ , and team voice,  $\beta = -.05$ ,  $t(44) = -0.30$ ,  $p > .05$  accounted for only 1% ( $\Delta R^2 = 0.01$ ) of the variance in team performance after accounting for team sex composition.

Thus, they were not significant mediators of the relationship between team sex composition and team performance. Finally, team psychomotor ability accounted for a significant amount of variance over sex composition and team processes ( $\Delta R^2 = .20, p < .05$ ).

Table 5  
*Hierarchical Regression Results for Team Process*

Step	Variable	$\beta$	$R^2$	$\Delta R^2$
1	Team Voice	.02	.02	
	Cohesion	.12	.02	
2	Team sex composition	.60*	.35*	
3	Team sex composition	.61		
	Team voice	-.05		
	Cohesion	.01	.36	.01
4	Team sex composition	.49*		
	Cohesion	.08		
	Team voice	-.10		
	Team psychomotor ability	.46*	.56*	.20*

*Note.*  $N = 46$  teams. \* $p < .05$ . Team performance was operationalized as the mean of all the team missions. Step 4 is the complete hierarchical model with team sex composition entered into the model first.

The present study sought to answer the following research question: Which, team processes or psychomotor ability provides a stronger explanatory mechanism for the sex composition-team performance relationship? The results indicated that team psychomotor ability is a stronger explanatory mechanism ( $\Delta R^2 = .20$ ) than team processes ( $\Delta R^2 = .01$ ) for the relationship between team sex composition and team performance.

## **CHAPTER IV**

### **DISCUSSION**

The current study is a constructive replication of Jarrett et al.'s (2012) recent investigation of team sex composition effects on team performance on a complex psychomotor task in that it had the same variables and effects, but used a different performance task and team size. It is also an extension of Jarrett et al. in that they did not investigate the differential and comparative effects of team processes and psychomotor ability. Thus, the objective of the present study was to investigate the comparative contribution of team psychomotor ability and team processes to the observed performance differences between high-female and low-female proportion teams. Overall, the results indicated that team psychomotor ability contributes more to the relationship between team sex composition effects and team performance on complex psychomotor tasks, and that the effects of team processes are negligible.

#### **Implications and suggestions for future research**

Because sex differences have been demonstrated to affect performance on psychomotor tasks at both the individual-level and team-level, with males demonstrating higher performance scores (e.g., Jarrett et al., 2012; Brown et al., 1997), it was hypothesized that teams with a lower proportion of females will have higher levels of performance. Consistent with Jarrett et al. (2012), the results of the current study found that teams with a lower proportion of females had higher performance scores. These effects may be particularly relevant in lab-based research, given the number of team research studies that have ignored team sex composition when defining the models. That is, lab-based team research studies that fail to acknowledge or account

for team sex composition as a potential explanatory variable for performance on synthetic team task performance environments may misattribute the ability of their training and other interventions or variables of interest to explain the observed effects. These findings suggest that studies using complex psychomotor tasks should consider controlling for team sex composition. For instance, Jarrett et al. (2012) found that when sex composition was not controlled for, the magnitude of the observed relationship between their variable of interest and team performance was amplified, which suggests that team researchers may be overestimating the predictive validity of their variables of interest when team sex composition is not taken into account.

Psychomotor ability has extensively demonstrated sex differences which, in turn, affect performance on psychomotor tasks (e.g., Brown et al., 1997; Ruff & Parker, 1993). Consistent with previous research, the results of the present study indicated that team psychomotor ability was a significant predictor of team performance on complex psychomotor tasks. In order to circumvent this issue, previous research that used complex psychomotor tasks, such as Space Fortress, have used all-male teams (e.g., Arthur, Day, Bennett, McNelly, & Jordan, 1997; Day et al., 2005; Edwards, Day, Arthur, & Bell, 2006; and also Hughes et al., 2013). However, studies that use this methodology as a means for controlling for psychomotor ability threaten the external validity of the study. Thus, it is suggested that when sex composition across teams is unbalanced, lab-based complex skill acquisition training research studies should consider prescreening for psychomotor ability to permit the control of pre-existing psychomotor ability differences when this variable is not of interest.



Consistent with previous investigations which demonstrated a positive relationship between team processes and team performance on non-psychomotor tasks (e.g., Beal et al., 2003; Mesmer-Magnus & DeChurch, 2009), it was predicted that higher levels of cohesion and team voice will result in higher performance on complex psychomotor tasks as well. However, despite being consistently demonstrated in previous research on non-psychomotor tasks, neither cohesion nor team voice were predictors of team performance in the present study. These results may suggest that team processes have little influence on team performance on complex psychomotor tasks. For instance, because complex psychomotor tasks are characterized to rely heavily on task behavior, cohesion and voice may not facilitate the amount of task behavior needed to influence team performance. This may be particularly relevant to lab-based team researchers who use synthetic team performance tasks to investigate the influence of process variables on team performance. That is, complex psychomotor tasks may not be appropriate tasks to use when studying the relationship between team processes and team performance.

Conceptually, it seems reasonable to posit that both psychomotor ability and team processes may be plausible explanations for sex composition's effects on team performance on complex psychomotor tasks. However, after investigating both influences simultaneously, the current study revealed that psychomotor ability empirically provides a much stronger explanatory mechanism than team processes in the sex composition-team performance relationship. Simultaneously investigating both psychomotor ability and team processes provides a better understanding of the effect of these variables on complex psychomotor tasks and provides guidance on the design and development of future studies involving complex skill acquisition training research using mixed sex teams.

## **Conclusion**

In order to reduce the likelihood of the unintended effects of team sex composition, it is important that researchers pay close attention to this variable. For instance, methodologically, researchers could ensure a balanced distribution of team sex composition and psychomotor ability across experimental conditions. Researchers should also report the team sex distribution across conditions to allow readers to independently determine the potential effect of team sex composition on the study findings. In conclusion, it is hoped that the findings of the present study encourage researchers to further empirically assess the importance of team sex composition effects on team performance on complex psychomotor tasks as well as implement new methodological strategies that will improve the design of future team training research that uses mixed sex teams.

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